Radiofrequency ablation of left-sided accessory pathway with epicardial approach

Krzysztof Myrda, Adam Wojtaszczyk, Piotr Buchta, Mateusz Witek, Mariusz Gąsior

3rd Department of Cardiology, School of Medicine with the Division of Dentistry in Zabrze, Medical University of Silesia in Katowice, Silesian Centre for Heart Disease, Zabrze, Poland

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A 23-year-old sportsman was admitted due to Wolf-Parkinson-White syndrome (WPW) with recurrent wide QRS complex tachycardia. According to Arruda's algorithm [1], a delta wave pattern in the 12-lead surface electrocardiogram suggested a left-sided accessory pathway (AP) (Figure 1 A). He underwent three unsuccessful radiofrequency (RF) ablations using the transseptal and transaortic approach with early arrhythmia recurrence. Structural heart disease was excluded.

In electrophysiological study presence of left-sided AP with bidirectional conduction was confirmed. With programmed stimulation from the right atrium and apex of the right ventricle, orthodromic atrioventricular reentrant tachycardia was repetitively induced. Using the electroanatomical 3D mapping system Carto 3 UniVu, an irrigated ablation catheter with contact force measurement Thermocool SmartTouch (Biosense Webster, Inc., Diamond Bar, CA, USA) and transseptal access, an activation map of the mitral annulus during sinus rhythm was made and confirmed the earliest ventricle activation in the posterolateral segment. Areas of scarring after previous ablation in the left atrium and ventricle were identified with voltage mapping. Despite increased RF energy in those locations the ablation was unsuccessful. Thus, we performed mitral annulus mapping via the coronary sinus (CS) and great cardiac vein and AP potential was identified with local time advance in relation to QRS onset of 22 ms. With single RF ablation pulse durable elimination of AP was achieved (Figure 1 B). In 6-month follow-up, there was no evidence of WPW syndrome recurrence.

Accessory pathways are mostly located in lateral segments of the mitral annulus [1]. When invasive treatment is indicated, RF ablation is the preferable method due to its high effectiveness [2]. Anatomical features of the AP such as a wide muscle band and an oblique or over the coronary sinus course with epicardial location (1.8% of APs) can be challenging [2]. Mapping of the CS via epicardial access should be performed especially when previous endocardial ablation has failed. In the present case, the CS had not been mapped during previous procedures. Ablation in this region may successfully eliminate the AP but often requires more attempts (66.7 vs. 91.7%; single and multiple ablations respectively) [2–4]. However, this approach could increase the risk of complications such as mechanical injury of the CS, which can lead to tamponade and thromboembolic events. Performing venography and utilization of 4-mm cooled-tip catheters can reduce the risk. Anatomical heterogeneity of CS and other cardiac veins, lower power settings as well as high impedance during RF ablation due to insufficient catheter cooling can limit the use of this method and increase the post-procedural recurrence rate.

Conflict of interest

The authors declare no conflict of interest.

Corresponding author:
Adam Wojtaszczyk MD, 3rd Department of Cardiology, School of Medicine with the Division of Dentistry, Medical University of Silesia, Silesian Centre for Heart Disease, 9 M. Curie-Skłodowskiej St, 41-800 Zabrze, Poland, fax: +48 668 836 277, e-mail: adam.wojtaszczyk@gmail.com
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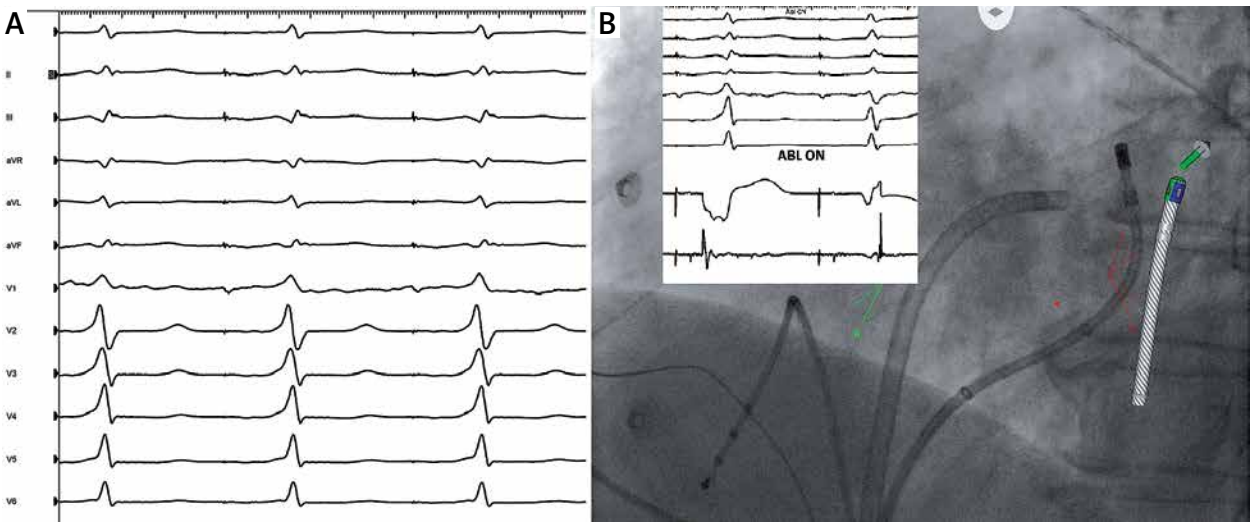

Figure 1. A – 12-lead electrocardiogram presenting delta wave, **B** – using electroanatomical 3D mapping system Cart 3 UniVu ablation electrode is projected on fluoroscopy in real time (left anterior oblique view). Diagnostic electrode is placed in apex of right ventricle, transseptal sheath is placed in left atrium, ablation electrode is placed in coronary sinus. Immediately after onset of ablation accessory pathway is gone

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